



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT : WEAVER et al.
SERIAL NO : 10/613,633
FILED : July 3, 2003
TITLE : WATER-SOLUBLE GLOBULIN CONCENTRATE FOR
IMPROVING GROWTH IN ANIMALS

Grp./A.U. : 1644
Examiner : Y. Kim
Docket No. : 1828.023US2

DECLARATION UNDER 37 C.F.R. § 1.132

Commissioner for Patents
P.O. Box 1450
Mail Stop
Alexandria, VA 22313-1450

Dear Sir:

I, Eric M. Weaver, declare the following:

1. That I am the Chief Scientific Officer of Proliant Health and Biologicals, a sister company of APC Inc., and an inventor in the above-identified patent application;
2. That I graduated in 1986 with a B.A. degree in Biology from the University of Northern Iowa, Cedar Falls, IA, and in 1989 with a Masters of Science Degree in Animal Science, Monogastric Nutrition from South Dakota State University, Brookings, SD. I also graduated in 1992 with a Doctorate in Animal Science, specializing in Monogastric Nutrition, from South Dakota State University, Brookings, SD;
3. That I have been working in the field of Animal Science since 1992. My background, work experience, publications, and expertise are described in my curriculum vitae (attached Exhibit A), which I incorporate by reference. In addition, I have maintained a financial interest in a farm that raises 12,000 pigs per year for the past 7 years;
4. That I am familiar with the above-identified patent application and the Office Action mailed June 29, 2006;

5. That attached, as Exhibit B, is a listing of standard abbreviations used in the art as accepted without definition by the Journal of Animal Science;

6. That an important part of the weaning process is changing the diet of pigs from sow milk to dry feed. Feed consumption, growth rate and the efficiency of converting feed to body weight are important measures of performance in pork production. Ermer et al. (1994) demonstrated that newly weaned pigs consuming diets with spray-dried plasma (herein referred to as SDP) prefer the diet supplemented with SDP when compared to a diet supplemented with milk products and that feed intake increased more rapidly on diets supplemented with SDP. (See attached Exhibit C to Ermer, P.M., P.S. Miller and A.J. Lewis. 1994. "Diet Performance and Meal Patterns of Weanling Pigs Offered Diets Containing Either Spray-dried Porcine Plasma or Dried Skim Milk". J. Anim. Sci. 72: 1548-1554.) Gonyou (1999) reported that newly weaned 21-day-old pigs consumed nearly normal levels of a feed that was supplemented with SDP in the first 24 hours following weaning. However, newly weaned 12 day old pigs did not begin consuming significant amounts of feed until 36 hours following weaning. Gonyou (1999) also reported that early-weaned pigs do not recognize solid feed as food for approximately 2-3 days after weaning. (See attached Exhibit D to Gonyou, H.W. 1999. "The Eating Behavior of Pigs and Feeder Design". Carolina Swine Nutrition Conference, pp. 11-23.) Thus, the delivery of SDP or plasma proteins through the water, rather than feed, greatly increases the opportunity for consumption when pigs are weaned at ages less than 21 days of age;

7. That various studies have determined the optimum level of SDP in weaning pig diets by providing levels of 0 to 10% plasma. These studies demonstrate that ADG, ADFI and G/F are linearly improved when increasing levels of SDP are included in the diet and then plateau when optimal levels are achieved;

8. That attached Exhibit E to Gatnau, R. and D.R. Zimmerman, T. Diaz and J. Johns. 1990. "Determination of the optimum Concentration of Spray-dried Porcine Plasma in Diets for Weanling Pigs", reported maximum average daily gain (ADG), average daily feed intake (ADFI) and gain/feed ratio (G/F) was achieved with the inclusion of 6% SDP and that higher levels of SDP did not result in further improvements in growth performance;

9. That attached Exhibit F to Gatnau, R. and D.R. Zimmerman. 1991. "Determination of Optimum Levels of Inclusion of Spray-dried Porcine Plasma in Diets for Weanling Pigs Fed in Practical Conditions", reported maximum ADG, ADFI, G/F was achieved with the inclusion of 6% SDP and that higher levels did not result in further improvements in growth performance;
10. That attached Exhibit G to Burham L.L., Hancock, L.H., Kim, L.H., Cabrera, M.R., Larsen, K.L., and Hines, R.H., 1995, "Spray-dried Wheat Gluten and Porcine Plasma Protein Blends for Nursery Pigs," reported maximum ADG, ADFI, G/F was achieved with the inclusion of 4% SDP and that higher levels did not result in further improvements in growth performance;
11. That attached Exhibit G to Nessmith, W.B., Tokach, M.D., Goodband, R.D., Nelssen, J.L., Bergstrom, J.R., Smith, J.W., Owen, K.Q. and Robert, B.T., 1995, "The Effects of Substituting Spray-dried Whole Egg from Grading Plants Only for Spray-dried Animal Plasma in Phase I Diets", reported maximum ADG, ADFI, G/F was achieved with the inclusion of 3.5% SDP and that higher levels did not result in further improvements in growth performance;
12. That spray-dried plasma is included in the postweaning diet of young, weaned pigs at a level of 7% of the complete diet (Coffey and Cromwell, 2001, attached Exhibit H). The relative responses reported, based studies which included a total of 8,448 pigs, was 25%, 21%, and 4% improvements in ADG, ADFI, and G/F, respectively.
13. That I designed an experiment to evaluate the effects of the addition of increasing levels of a concentrated spray-dried plasma product to the water source of young pigs on their growth performance. This study was performed by individuals under my direction. The feed provided for the pigs in this experiment was supplemented with 5% spray-dried plasma. A summary of growth and feed intake in the first 4 days of the experiment is shown in Table 1. The pigs that received water containing either 1.25% or 2.5% of the plasma product gained more weight and consumed more feed than pigs that received water without supplementation ($P < .05$).

Table 1. Least squares means of growth performance in nursery pigs¹.

Item	Concentration of Water Solution, %				SEM
	0	1.25	2.50	5.0	
Day 0 to 4					
ADG, kg/d	0.042 ^a	0.105 ^b	0.125 ^b	0.088 ^{ab}	0.016
% Improvement in ADG	0	150	198	110	
ADFI, kg/d	0.069 ^a	0.092 ^b	0.092 ^b	0.094 ^b	0.006
ADWI, mL/d	506 ^a	650 ^b	661 ^b	643 ^b	16

^{ab}Means in the same row with different superscript differ ($P < 0.05$).

¹SEM = Standard error of mean; ADG = average daily gain; ADFI = average daily feed intake;

ADWI = average daily water intake.

14. That another study was later published in scientific abstract form in the Journal of Animal Science. See attached Exhibit I to Borg, B.S., Campbell, J.M., Russell, L.E., Thomson, D.E., and Weaver, E.M., "Effects Of Water Soluble Globulin On The Performance Of Weanling Pigs". J. Anim. Sci. 77 (Suppl. 1):193. (Abstr.) (1999). The authors reported similar improvements in average daily gain when plasma was included in the drinking water. Very similar observations were reported by an independent research group in a subsequent publication in the Journal of Animal Science. See attached Exhibit J to Ward, M.M. and Cook, D.R. "Effect of SoluteinTM (Sol) on Rate and Efficiency of Body Weight Gain in Weaned Pigs". J. Anim. Sci. 79 (Suppl. 1):53 (Abstr.) (2001) (Solutein is the trade name under which water soluble plasma is sold).

15. That based on the data reported (Table 1), average daily gain (ADG) in pigs offered diets supplemented with SDP and also offered water supplemented with 2.5% of the plasma product, was improved 198%. The magnitude of the growth response to the supplementation of water with the plasma product in this study is much greater than the expected growth response to diets supplemented with SDP;

16. That further trials utilizing pigs receiving plasma product supplementation through both water and feed compared to pigs receiving SDP supplementation only

through feed resulted in a weighted average of 34% improvement in ADG. The average of the 7 trials (Table 2) resulted in an additional 34% improvement in ADG due to the addition of plasma products to the water;

Table 2. The relative response of pigs receiving plasma product supplementation through both water and feed compared to pigs receiving SDP supplementation only through feed

<u>Trial</u>	<u>Days</u> ¹	<u>N</u> ²	<u>ADG</u> ³	<u>ADFI</u> ⁴	<u>G:F</u> ⁵
1	0-7	192	41.1%	18.9%	19.5%
2	0-7	156	13.7%	1.1%	12.8%
3	0-7	104	30.8%	14.8%	13.1%
4	0-7	94	11.5%	5.2%	-5.3%
5	0-7	94	14.2%	18.5%	1.1%
6	0-7	300	23.1%	4.1%	17.3%
7	0-7	300	65.4%	32.8%	26.7%
Average		1,240	34.0%	15.0%	16.1%

¹Days = days post-weaning.

²N = number of pigs represented.

³ADG = average daily gain.

⁴ADFI = average daily feed intake.

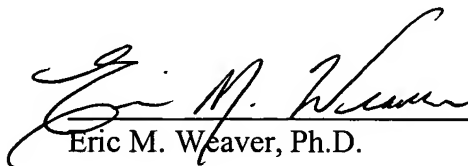
⁵G:F = gain:feed ratio

17. That the supplementation of spray-dried plasma in the feed improves performance in weaned pigs; however, the supplementation of plasma protein through water supplementation increases growth rate and feed intake beyond the level of performance that can be achieved with feed supplementation. This is clear because the loss of lean body mass in the first few days postweaning due to immune stimulation is greater than was known in the literature. The “postweaning lag syndrome” in weaned pigs is characterized by a lack of appetite and diarrhea. It has been inaccurately ascribed to infectious disease in the first few weeks postweaning. However, I believe that weaning initiates a low level inflammatory process that causes body weight loss in the young animal. Providing plasma via water in the first days or even hours postweaning clearly improves nutrient utilization and appetite so that the pig maintains body weight

more efficiently. Thus, I believe that this data demonstrates that plasma in the water reduces the immune stimulatory response prompted by weaning to a much greater degree than does plasma in the feed. Additionally, during the weaning process, delivery via the water allows for greater ability to deliver plasma proteins than feed.

18. That the undersigned further declares that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patents issuing thereon.

Date: 9/11/2004


Eric M. Weaver, Ph.D.